

MWI 8715.4

REVISION C

EFFECTIVE DATE: September 30, 2003

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MARSHALL WORK INSTRUCTION

QS01

PERSONAL PROTECTIVE EQUIPMENT (PPE)

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DOCUMENT HISTORY LOG

| Status (Baseline/ Revision/ Canceled) | Document Revision | Effective Date | Description |
|--|----------------------|-------------------|---|
| Baseline | | 12/20/99 | |
| Revision | A | 9/15/00 | Section 2, Applicability, added JHA's may be used in place of PPE assessment of office environments with no hazards; added MWI 8715.15 to Applicable Documents; added "If such hazards are present or likely to be present, the supervisor shall:" to section 6.1.1; added "using Appendix A or equivalent" to section 6.1.1.2; added "NOTE" to section 6.1.4; and changed section 9.2 to read "Supervisor shall maintain a copy of the PPE assessment (Appendix A or equivalent) for their area of responsibility for all machines, operations or tasks which require the use of PPE." |
| Revision | B | 5/31/01 | The document has been rewritten in its entirety. |
| Revision | C | 9/30/2003 | The document has been rewritten in its entirety. |
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1. PURPOSE

The purpose of this Marshall Work Instruction (MWI) is to establish a Personal Protective Equipment (PPE) Program at Marshall Space Flight Center (MSFC). This document will provide supervisors guidance in determining the need for PPE, the selection of PPE, and the training requirements in the use of PPE. PPE is special equipment designed to protect workers from hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact. This includes personal protective equipment for your eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers etc. Inclement weather clothing, such as raincoats, parkas, and boots, is not considered protective safety clothing.

2. APPLICABILITY

This instruction applies to all MSFC work operations performed on and off the Center, and to employees performing those operations. Instructions provided in this instruction apply to MSFC civil service employees involved in any MSFC operation where identified hazards cannot be eliminated through engineering or procedure controls. PPE is required for MSFC operations where workplace hazards cannot be effectively eliminated by work practice, engineering controls and/or administrative controls. Contractors may use this instruction or develop their own, but a PPE program must be addressed in their safety and health program documents.

3. APPLICABLE DOCUMENTS

- 3.1 29 CFR 1910.23, "Guarding floor and wall openings and holes"
- 3.2 29 CFR 1910.95, "Occupational Noise Exposure and Hearing Protectors"
- 3.3 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response"
- 3.4 29 CFR 1910.132, "General Requirements"
- 3.5 29 CFR 1910.133, "Eye and Face Protection"
- 3.6 29 CFR 1910.134, "Respiratory Protection"

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- 3.7 29 CFR 1910.135, "Head Protection"
- 3.8 29 CFR 1910.136, "Foot Protection"
- 3.9 29 CFR 1910.138, "Hand Protection"
- 3.10 29 CFR 1910.1000-1050, "Occupational Toxic and Hazardous Substances"
- 3.11 29 CFR 1910.1030, "Bloodborne Pathogens"
- 3.12 29 CFR 1926.500-503, "Fall Protection"
- 3.13 ANSI A10.11, "For Construction and Demolition Operations - Personnel and Debris Nets"
- 3.14 ANSI Z41, "Personal Protection - Protective Footwear"
- 3.15 ANSI Z88.2, "Respiratory Protection"
- 3.16 ANSI Z87.1, "Practice for Occupational and Educational Eye and Face Protection"
- 3.17 ANSI Z89.1, "Industrial Head Protection"
- 3.18 ANSI Z358.1, "Emergency Eyewash and Shower Equipment"
- 3.19 ANSI Z359.1, "Safety Requirements for Personal Fall Arrest Systems, Subsystems, and Components"
- 3.20 MPD 1840.3, "MSFC Respiratory Protection Program"
- 3.21 MWI 5113.1, "Governmentwide Commercial Purchase Card Operating Procedures"
- 3.22 MWI 8715.3, "Hazard Warning Signs and Barricades"
- 3.23 MWI 8715.15, "MSFC Safety Assessment Program"

4. REFERENCES

- 4.1 NPG 8715.3, "NASA Safety Manual"
- 4.2 MPD 1860.2, "Radiation Safety Program"
- 4.3 MPD 1860.1, "Laser Safety"
- 4.4 29 CFR 1910 Subpart I, "Personal Protective Equipment"

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4.5 29 CFR 1926 Subpart E, "Personal Protective and Life Saving Equipment"

4.6 OSHA 3074, "Hearing Conservation"

4.7 OSHA 3077, "Personal Protective Equipment"

4.8 29 CFR 1910.137, "Electrical Protection"

5. DEFINITIONS

5.1 Administrative Control. Establish and document controls involving changes in how or when employees do their job, such as scheduling work and rotating employees to reduce exposures.

5.2 Affected Employee. Employee who may be in contact with a hazard that requires the use of PPE.

5.3 Engineering Control. Eliminate a workplace hazard by design, or by modifying the work environment or process by physically changing a machine to prevent any employee contact with the hazard.

5.4 Facility Risk Indicator (FRI). An indicator used to help determine the level of system safety effort required to meet NASA safety requirements. The FRI assessment classifies the severity of potential hazards inherent to the facility itself: its operations, processes, environment, equipment, potential interfaces, and personnel. (Reference MWI 8715.15, "MSFC Safety Assessments," for more information.)

5.5 Fall Protection. Includes safety harness, lanyards, and life lines.

5.6 Operation. Includes any job, task, or process that may require the use of PPE determined by a PPE hazard assessment.

5.7 PPE Hazard Assessment. An assessment of the workplace, performed by an employee's immediate supervisor, to determine if hazards are present, or are likely to be present, which necessitate the use of PPE.

5.8 Procedure Control. An established procedure intended to reduce the risk of unplanned hazardous events and/or limit employee access to hazard exposures while performing a designated task, operation, or process.

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5.9 Work Practices. Establish training for employees on how to perform tasks in ways that reduce their exposure to workplace hazards.

6. INSTRUCTIONS

The use of PPE is considered the "last line of defense" against identified hazards, and shall not be used as a substitute for engineering, administrative, and procedural controls, or changes in established safe work practices. PPE should be used in conjunction with these controls to provide the employee with a safe and healthful workplace. The use of PPE is required when hazards from the work area, processes, environment, chemical hazards, radiological hazards, or mechanical irritants are encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation, or physical contact.

6.1 PPE Hazard Assessment:

6.1.1 Each supervisor shall perform a PPE hazard assessment for the work area and the operations in their area of responsibility. This assessment is the foundation of the PPE Program and should be an in depth evaluation of the equipment needed to protect employees against the hazards in the workplace. The PPE hazard assessment will be performed in accordance with 29 CFR 1910.132 (d), "Hazard Assessment and Equipment Selection," and this instruction.

6.1.1.1 Define the work area or operation to be assessed.

6.1.1.2 Identify the hazards or the potential hazards in the work area or for a particular operation. (Reference Appendix B for a list of common hazards in the work area.)

6.1.1.3 Determine the areas of the body or body systems that are affected by the hazard. (Reference Appendix B for the list of common hazards and affected areas of the body.)

6.1.1.4 Estimate the potential and/or frequency for employee contact with the hazard.

6.1.1.5 Estimate the consequences of employee contact with the hazard in the area. (Reference MWI 8715.15, "MSFC Safety Assessment Program," section 5, Definitions, "Facility Risk Indicator (FRI).")

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6.1.1.6 All identified hazards associated with the work area or operation should be ranked by the amount of risk to the employee.

6.1.1.7 The FRI may be used to help the supervisor determine the amount of risk associated with the hazard in the work area or with the operation.

6.1.1.8 If the supervisor is unable to determine the amount of risk associated with the hazard in the work area or with the operation, contact the Safety and Mission Assurance (S&MA) Office for assistance.

6.1.1.9 Identified hazards with the highest amount of risk (loss of life, permanent disability, serious occupational illnesses, etc.) should be assigned the highest priority for prevention or minimization.

6.1.2 Supervisors shall determine if engineering, administrative, procedural controls or changes in the employee work practices can be implemented to eliminate the employee exposure to all identified hazards. (Reference definitions sections 5.1, 5.3, 5.8 and 5.9.)

6.1.3 If employee exposure to the hazard cannot be eliminated, the supervisor shall use Appendix B or an equivalent evaluation method to determine what type PPE is required to be worn or used in the work area or while performing the operation.

6.1.4 Employee shall receive training in accordance with section 10.1 before working in any area or performing any operation that requires the use of PPE.

6.1.5 Supervisors shall list any required PPE to be worn or used in the work area or during operations in the appropriate JHA or OP.

6.2 PPE Selection:

6.2.1 Head Protection

6.2.1.1 Head protection will be required where there is a potential for head injury caused by falling or flying objects, or by bumping the head against a fixed object and in some cases against electrical shock.

6.2.1.2 Head protection is divided into type and class. Each type and class of head protection is intended to provide protection against specific hazardous conditions.

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a. Type 1 - helmets with full brim, not less than 1 1/4 inches wide.

b. Type 2 - brimless helmets with a peaking extending forward from the crown.

c. Class A - general service, limited voltage protection, intended for protection against impact hazards. These are used in construction, manufacturing, lumbering, tunneling and shipbuilding.

d. Class B - utility service, high-voltage helmets, intended for protection against impact and penetration by falling or flying objects and from high-voltage shock and burns. These are used extensively by electrical workers.

e. Class C - special service, no voltage protection, designed specifically for lightweight and impact protection. This class is usually manufactured from aluminum and offers no dielectric protection.

6.2.1.3 Reference ANSI Z89.1, "Requirements for Protective Headwear for Industrial Workers," or contact S&MA if more information is needed.

6.2.2 Eye and Face Protection

6.2.2.1 Eye and face protection will be required where there is a potential for injury to the eyes or face from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, potentially injurious radiation or a combination of these. Protectors must meet the following minimum requirements:

a. Provide adequate protection against the particular hazards for which they are designed.

b. Be reasonably comfortable when worn under the designed conditions.

c. Fit snugly without interfering with the movements or vision of the wearer.

d. Be durable, capable of being disinfected, easily cleanable.

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6.2.2.2 If the work involves the use of chemicals reference the chemical's Material Safety Data Sheet (MSDS) for the correct eye and face protection requirements.

6.2.2.3 Reference ANSI Z87.1, "Practice for Occupational and Educational Eye and Face Protection," or contact S&MA if more information is needed.

6.2.2.4 All prescription safety glasses purchased for civil service employees by NASA shall have fixed or nonremovable side shields. Any prescription safety eyewear used to meet MSFC requirements for eye protection shall have side shields that comply with ANSI A87.1 specifications. Compliant clip-on type side shields are allowed.

6.2.2.5 All PPE used to meet MSFC requirements for eye and face protection against radiation hazards will comply with the requirements of MPD 1860.2, "Radiation Safety Program." Contact OMEHS for more information.

6.2.3 Hearing Protection

6.2.3.1 Hearing protection will be required where there is a potential for exposure to high noise levels or excessive noise exposure. Any employee exposed to noise at or above 85 decibels (dB) averaged over 8 working hours, or an 8 hour time-weighted average (TWA) shall wear hearing protection.

6.2.3.2 Preformed or molded earplugs or earmuffs that adequately reduce the severity of the noise level for the employee in the work environment may be used.

6.2.3.3 Contact Occupational Medicine and Environmental Health Services (OMEHS), if you feel a noise survey is required for the work area.

6.2.3.4 Reference 29 CFR 1910.95, "Occupational Noise Exposure," or contact OMEHS if more information is needed.

6.2.4 Respiratory Protection

6.2.4.1 Respirators will be required when engineering controls are not feasible and employees are to protect themselves against adverse health effects caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors.

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6.2.4.2 Respiratory protection equipment used to meet MSFC respiratory protection requirements shall comply with the requirements of MPD 1840.3, "MSFC Respiratory Protection Program." Contact OMEHS for more information.

6.2.5 Arm and Hand Protection

6.2.5.1 Arm and Hand protection will be required where there is potential for injury to the arms and hands such as burns, cuts, electrical shock, amputation, and absorption of chemicals.

6.2.5.2 Gloves, hand pads, sleeves, and wristlets provide protection against a variety of hazardous situations.

6.2.5.3 Documentation from the manufacturer should be obtained to verify the glove, sleeve, hand pad or wristlet will provide appropriate protection for the hazard.

6.2.5.4 If the work involves the use of chemicals, reference the chemical's MSDS for correct protection requirements.

6.2.5.5 Reference 29 CFR 1910.138, "Hand Protection," or contact S&MA or OMEHS if more information is needed.

6.2.6 Foot and Leg Protection

6.2.6.1 Foot and Leg protection will be required where there is potential for injury to the leg or feet from falling or rolling objects, sharp objects, molten metal, hot surfaces, and wet slippery surfaces.

6.2.6.2 Safety shoes or boots and leggings can be worn to provide protection against the hazard.

6.2.6.3 Reference 29 CFR 1910.136, "Foot Protection," or contact S&MA if more information is needed.

6.2.7 Torso and General Skin Protection

6.2.7.1 Torso protection will be required where there is potential of injury to the torso from heat, splashes from hot metals and liquids, impacts, cuts, acids, and radiation.

6.2.7.2 A variety of protective clothing is available such as vest, jackets, aprons, coveralls, and full body suits made from the appropriate material to provide protection against the hazard.

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6.2.7.3 If the work involves the use of chemicals, reference the chemical's MSDS for correct protection requirements. Contact OMEHS or S&MA if more information is needed.

6.2.8 Fall Protection

6.2.8.1 Fall protection will be required where any employees are working/walking on surfaces (horizontal or vertical) that have an unprotected side or edge that is 6 feet or more above a lower level.

NOTE: Every open-sided floor or platform 4 feet or more above an adjacent floor or ground level shall be guarded by a standard guard railing system; reference 29 CFR 1910.23, "Guarding floor and wall openings and holes."

6.2.8.2 Fall protection can be in a form of a personal fall arrest system, safety net system, or use of a guardrail system.

6.2.8.3 Reference 29 CFR 1910.501, "Duty to have fall protection," or contact S&MA if more information is needed.

6.2.9 Emergency Eyewash and Safety Shower Devices

6.2.9.1 Emergency eyewash and/or safety showers will be required within the work area where employees are exposed to injurious corrosive chemicals.

6.2.9.2 Reference the chemical MSDS for the correct eyewash and/or safety shower protection requirements.

6.2.9.3 Reference ANSI Z358.1, "Emergency Eyewash and Shower Equipment," or contact S&MA or OMEHS if more information is needed.

6.3 Provisions of PPE

6.3.1 Use of PPE is required in all operations and posted work areas where the PPE hazard assessment identified the need to protect personnel against injury or illness. Supervisors shall communicate PPE requirements for operations and environments within their area of responsibility, including signage designating work areas and equipment as PPE-required areas.

6.3.2 Supervisors shall ensure that employees are provided with required and selected PPE for operations and environments within their area of responsibility.

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6.3.3 Host employers and prime contractors are responsible for ensuring that contractors and subcontractors understand and communicate PPE requirements, and provide compliant equipment to affected employees within their organizations.

6.3.4 All employers and personnel working at MSFC are responsible for notifying affected organizations and employees of temporary PPE requirements and selection specifications for scheduled, urgent, and emergency non-routine operations.

6.3.5 All employers, organizations, supervisors, and employees shall communicate and enforce the use of required PPE by affected employees and visitors, to prevent injury and illness in posted work areas and for routine and non-routine operations.

6.3.6 As required by OSHA Standard 1910.132(b), where employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including proper maintenance and sanitation of such equipment.

6.3.7 As required by OSHA Standard 1910.132(e), defective or damaged PPE shall not be used."

6.3.8 PPE Sources for NASA Civil Service Employees

6.3.8.1 A variety of PPE (non-prescription safety glasses, hearing protection, hand protection, head protection, etc.) is stocked in the MSFC retail supply store.

6.3.8.2 Supervisors also have the option to purchase PPE from off-site vendors, using the organization's credit card. Supervisors shall ensure that procured PPE within their areas of responsibility meets the specifications of 29 CFR 1910.132, "General Requirements," for affected employees and visitors exposed to hazards. PPE will comply with OSHA requirements, and meet or exceed the following recognized performance standards:

- Eye and Face Protection - 29 CFR 1910.133 - ANSI Z87.1
- Respiratory Protection - 29 CFR 1910.134 - ANSI Z88.2
- Head Protection - 29 CFR 1910.135 - ANSI Z89.1
- Foot Protection - 29 CFR 1910.136 - ANSI Z41
- Electrical Protection - 29 CFR 1910.137
- Hand Protection - 29 CFR 1910.138
- Occupational Noise Exposure and Hearing Protectors - 29 CFR 1910.95 (i) and (j)
- Hazardous Waste Operations and Emergency Response - 29 CFR 1910.120 (g)(3) and (g)(5)

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- Occupational Toxic and Hazardous Substances - 29 CFR 1910.1000-1050
- Bloodborne Pathogens - 29 CFR 1910.1030 (c)(3)
- Fall Protection - 29 CFR 1926.500-503; ANSI A10.11; and ANSI Z359.1
- Emergency Eyewash Equipment - ANSI Z358.1"

6.3.8.3 A safety shoe vendor and prescription safety glasses vendor visit MSFC monthly, according to the scheduled location and times posted on "Inside Marshall." Safety shoes and prescription safety eyewear are available to both civil service and contractor personnel at competitive prices. NASA civil service employees may purchase required PPE with their organization's purchase card, as directed in MWI 5113.1, "Government wide Commercial Purchase Card Operating Procedures." If more information is needed, contact S&MA."

6.4 Signage for PPE Requirements

6.4.1 Appropriate signs stating any PPE requirements shall be posted in visible locations within work areas or areas adjacent to processes and operations that require employee protection on a routine basis. These signs shall be installed and maintained in visible and legible condition, so they are easily seen and understood by employees and visitors.

6.4.2 A variety of safety signs are available in the MSFC substore, or unique signs may be purchased from a variety of vendors using the organization's credit card. Contact the S&MA Office for vendor names.

6.5 Fitting PPE

6.5.1 Careful consideration must be given to comfort and fit of PPE. PPE that fits poorly will not afford the necessary protection. Continued wearing of the device is more likely if it fits the wearer comfortably. Protective devices are generally available in a variety of sizes. Care should be taken to ensure that the right size is selected.

6.5.2 Devices with adjustable features shall be adjusted on an individual basis to assure a comfortable fit that will maintain the protective device in the proper position. Where manufacturer's instructions are available, they should be followed carefully.

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6.5.2.1 Particular care should be taken in fitting devices for eye protection against dust and chemical splash to ensure that the devices are sealed to the face.

6.5.2.2 Proper fitting of helmets is important to ensure that they will not fall off during work operations. In some cases a chin strap may be necessary to keep the helmet on an employee's head. (Chin straps should break at a reasonably low force, however, so as to prevent a strangulation hazard)."

6.5.3 Supervisors and affected employees shall ensure that all required and/or used PPE fits properly.

6.5.4 PPE shall not be modified without written authorization from the manufacturer, followed by concurrence from the S&MA Office.

6.6 Use of PPE

6.6.1 Employees shall receive training in accordance with paragraph 10.1 before working in any area or performing any operation that requires the use of PPE.

6.6.2 Affected employees and visitors shall wear or use PPE per established and posted policies and manufacturer's instructions.

6.6.3 Supervisors and affected employees shall ensure PPE is kept clean and properly maintained per manufacturer's instructions. Defective or damaged PPE shall not be used.

6.6.4 Contaminated PPE that cannot be decontaminated is disposed of in a manner that protects employees from exposure to hazards. Contact the Environmental Engineering Department (EED) for disposal procedures of contaminated PPE.

7. NOTES

None

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8. SAFETY PRECAUTIONS AND WARNING NOTES

Appendix A provides a guideline that list operations and chemical hazards that require the use of PPE.

9. RECORDS

9.1 PPE Training Documentation.

9.1.1 PPE Training Documentation shall be maintained for the length of the employee's employment, then destroyed or maintained for historical purposes.

9.1.2 As required by OSHA Standard 1910.132(f)(4), each employer shall verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

9.1.3 PPE Training Documentation for MSFC civil service employees will be maintained by the Employee & Organizational Development Department.

9.2 PPE Hazard Assessment Documentation.

9.2.1 As required by OSHA Standard 1910.132(d)(2), each employer shall verify that the required workplace hazard assessment has been performed through a written certification that identifies: the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and, which identifies the document as a certification of hazard assessment.

9.2.2 Decisions reached during the PPE hazard assessment and selection process shall be documented in a manner that records: identification of location and/or process, operation, or task; identified hazard exposures; affected body parts and potential severity of injury or illness; affected employees by function or job title; and specifications for the corresponding selected PPE.

9.2.3 Appendix B, or an equivalent spreadsheet or evaluation record, may be used for this purpose if it addresses all items listed in paragraph 9.2.2.

9.2.4 PPE Hazard Assessment Documentation shall be maintained for the length of time the work area or operation requires the use of PPE, then destroyed or maintained for historical purposes.

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MSFC civil service supervisors shall maintain these records for all areas and operations within their scope of responsibility.

9.3 Decisions regarding PPE requirements and selection should be incorporated into work instruction documentation whenever possible and appropriate, to facilitate communication to employees and visitors. Job hazard analyses (JHAs) and operating procedures (OPs) should document PPE requirements and selection specifications; these documents may also serve as the PPE Hazard Assessment Documentation, provided that they satisfy the requirements of paragraphs 9.2.1 and 9.2.2.

10. PERSONNEL TRAINING AND CERTIFICATION

10.1 Supervisor shall ensure affected employees have been trained in the proper use of PPE—in accordance with the requirements of 29 CFR 1910.132 (f), "Training." The training shall address the following:

10.1.1 When PPE is necessary.

10.1.2 What type PPE is necessary.

10.1.3 How to properly adjust and wear PPE.

10.1.4 The limitations of PPE.

10.1.5 The proper care, maintenance, useful life, and disposal of the PPE.

10.1.6 The affected employees shall demonstrate an understanding of the training.

10.2 Supervisors shall ensure additional training for affected employees is conducted when:

10.2.1 Changes in the work area or operation render previous PPE training obsolete.

10.2.2 Changes in the types of PPE to be used render the previous training obsolete.

10.2.3 When an employee's actions demonstrate to the supervisor that further instruction is required for the proper use of PPE.

10.3 Recommended training for affected employees:

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10.3.1 Employees working in machine shops: NSTC 204, "Machinery and Machine Guarding"; or equivalent.

10.3.2 Employees working in laboratories, NSTC 224, "Laboratory Safety and Health," or equivalent.

10.3.3 Employees working with electrical equipment, NSTC 309, "Electrical Safety Standards," or equivalent.

10.3.4 Employees working above ground level, NSTC 311, "Fall Protection," and NSTC 044, "Fall Protection Refresher," or equivalent.

10.3.5 Employees working with cryogenics, NSTC 313, "Cryogenics Safety," or equivalent.

10.3.6 Employees working with liquid nitrogen, NSTC 314, "Liquid Nitrogen Handler's Course," or equivalent.

10.3.7 Employees working with high-pressure systems, NSTC 317, "Safety in High-Pressure Operations," or equivalent.

10.3.8 Employees working with hydrogen, NSTC 037, "Hydrogen Safety," or equivalent.

10.3.9 Employees working with hypergol, NSTC 040, "Hypergol Safety," or equivalent.

10.3.10 Employees working with oxygen systems, NSTC 053, "Oxygen Systems: Operation and Maintenance," or equivalent.

10.3.11 Employees working with batteries, NSTC 036, "Battery Safety," or equivalent.

10.3.12 Supervisors, NSTC 005, "Manager's Safety," or equivalent.

10.3.13 NSTC 501, "General Industry Safety and Health," or equivalent.

10.4 Additional Personal Protective Equipment awareness can be accomplished by viewing any of the following safety videos:

10.4.1 "Grinding Wheel Safety II," tape no. 16333/Tel-A-Train

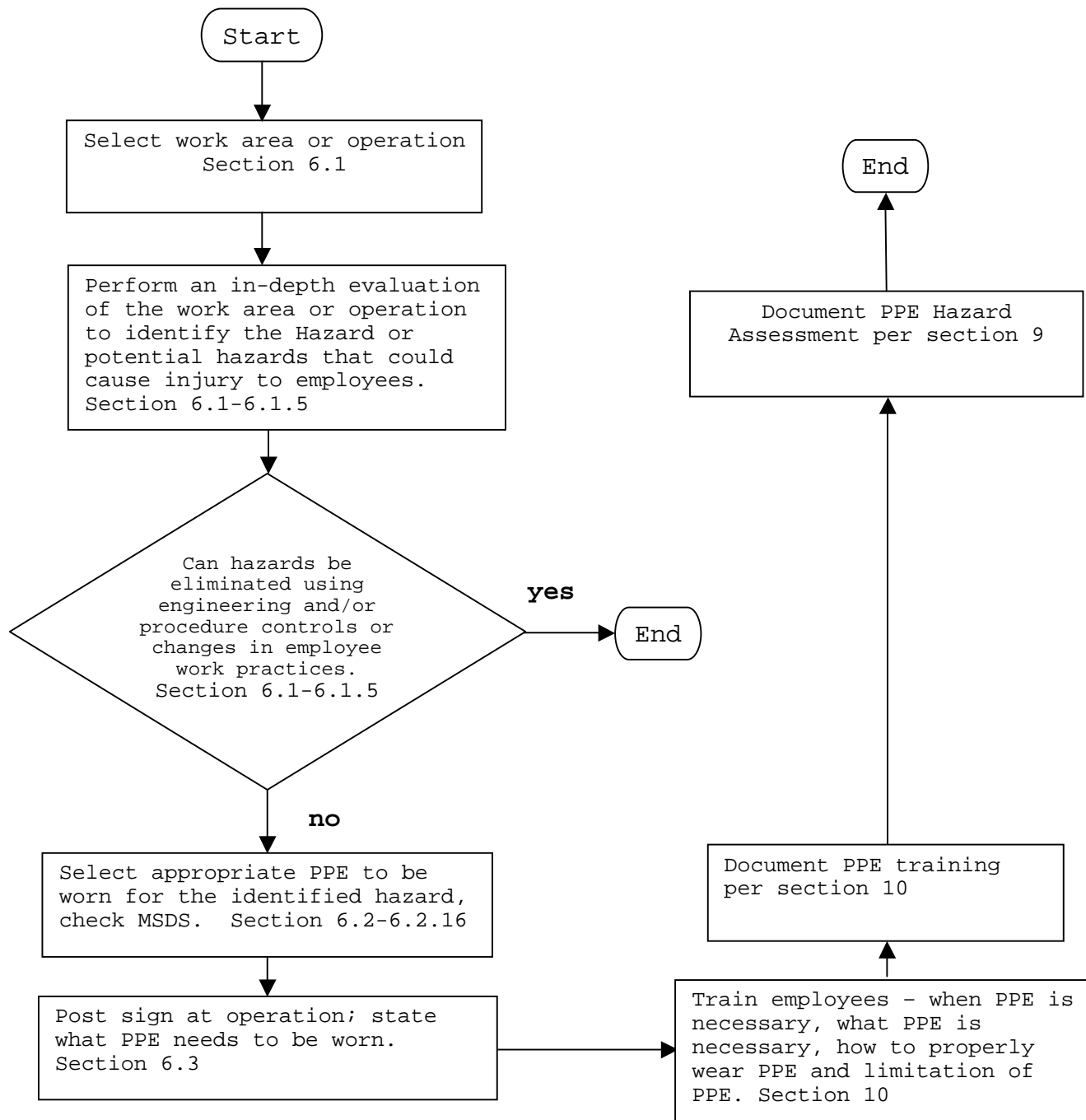
10.4.2 "Hand Tools and Portable Power Tools," tape no. 16334/National Safety Council

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- 10.4.3 "Lehigh Safety Film, Safety Shoes," tape no. 16336/Lehigh
- 10.4.4 "Safety Handling and Storage of Compressed Gases," tape 18406
- 10.4.5 "Air Compressors," tape no.18218
- 10.4.6 "The Danger Zone, Personal Protective Equipment," tape no. 17780/Summit
- 10.4.7 "Eye Safety," tape no. 18170/Tel-A-Train
- 10.4.8 "Hand Safety," tape no. 12047/Tel-A-Train
- 10.4.9 "Hearing Safety," tape no. 18427/Tel-A-Train
- 10.4.10 "Hearing Protection," tape no. 328
- 10.4.11 "Machine and Equipment Safety," tape no. 343
- 10.4.12 "Personal Protective Equipment," tape no 344
- 10.4.13 "Respiratory Safety: The Breath of Life," tape no. 348
- 10.4.14 "Eye Care: About Eye Safety," tape no. 351
- 10.4.15 "Skin Care and Safety," tape no. 355

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11. FLOW DIAGRAM



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12. CANCELLATION

MWI 8715.4B dated May 31, 2001

Original Signed by
Axel Roth for

David A. King
Director

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APPENDIX A

| Section and Title | Personal Protective Equipment (PPE) | | | | | | |
|--|-------------------------------------|----------------------------|---------------|---------------|-------------------------|-------------|-----------------------|
| 29 CFR 1910 Occupational Safety and Health Standards | Protective Clothing | Gloves or Hand- wear | Foot- wear | Head- wear | Eye or Face- wear | Respirators | Hearing Protectors |
| General Industry Standards | | | | | | | |
| 1910.94 Ventilation (abrasive blasting, spray finishing, and open surface tanks) | X | X | X | | X | X | |
| 1910.95 Occupational noise exposure | | | | | | | X |
| 1910.111 Storage and handling of anhydrous ammonia | | | | | | X | |
| 1910.120 Hazardous waste operations and emergency response | X | X | X | X | X | X | X |
| 1910.132 General PPE requirements | X | X | X | X | X | X | |
| 1910.133 Eye and face protection | | | | | X | | |
| 1910.134 Respiratory protection | | | | | | X | |
| 1910.135 Head protection | | | | X | | | |
| 1910.136 Foot protection | | | X | | | | |
| 1910.137 Electrical protective equipment | X | X | X | | | | |
| 1910.138 Hand protection | | X | | | | | |
| 1910.141 Sanitation (wet processes) | X | | X | | | | |
| 1910.156 Fire brigades | X | X | X | X | X | X | |
| 1910.183 Helicopters | | | X | X | X | | |

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|--|-------------------------------------|----------------------------|---------------|---------------|-------------------------|-------------|-----------------------|
| 29 CFR 1910 Occupational Safety and Health Standards | Protective Clothing | Gloves or Hand- wear | Foot- wear | Head- wear | Eye or Face- wear | Respirators | Hearing Protectors |
| General Industry Standards (continued) | | | | | | | |
| 1910.218 Forging machines | X | X | | | X | | |
| | | | | | | | |
| 1910.243 Guarding of portable powered tools | | | | X | X | | |
| 1910.252 Welding, cutting, and brazing | X | X | X | X | X | X | |
| 1910.261 Pulp, paper, and paperboard mills | X | X | X | X | X | X | X |
| 1910.262 Textiles | X | X | | X | X | X | |
| 1910.265 Sawmills | X | X | X | | X | X | |
| 1910.266 Pulpwood logging | | X | X | X | X | X | |
| 1910.268 Telecommunications | X | X | X | X | X | | |
| 1910.422 Procedures during diving | | X | | | | | |
| 1910.430 Equipment for diving | X | | | | | X | |
| 1910.1001 Asbestos | X | X | | | X | X | |
| 1910.1003 4-Nitrobiphenyl | X | X | X | X | X | X | |
| 1910.1004 alpha-Naphthylamine | X | X | X | | | X | |
| 1910.1006 Methyl chloromethyl ether | X | X | X | | | X | |
| 1910.1007 3,3'-Dichlorobenzidine | X | X | X | | | X | |
| 1910.1008 bis-Chloromethyl ether | X | X | X | | | X | |

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|--|-------------------------------------|----------------------------|---------------|---------------|-------------------------|-------------|-----------------------|
| 29 CFR 1910 Occupational Safety and Health Standards | Protective Clothing | Gloves or Hand- wear | Foot- wear | Head- wear | Eye or Face- wear | Respirators | Hearing Protectors |
| General Industry Standards (continued) | | | | | | | |
| 1910.1011 4-Aminodiphenyl | X | X | X | | | X | |
| 1910.1012 Ethyleneimine | X | X | X | | | X | |
| 1910.1013 beta-Propiolactone | X | X | X | | | X | |
| 1910.1014 2-Acetylaminofluorene | X | X | X | | | X | |
| 1910.1015 4-Dimethylaminoazobenzene | X | X | X | | | X | |
| 1910.1016 N-Nitrosodimethylamine | X | X | X | | | X | |
| 1910.1017 Vinyl chloride | X | | | | | X | |
| 1910.1018 Inorganic arsenic | X | X | X | | X | X | |
| 1910.1025 Lead | X | X | X | | X | X | |
| 1910.1027 Cadmium | X | X | X | | X | X | |
| 1910.1028 Benzene | X | X | X | | X | X | |
| 1910.1029 Coke oven emissions | X | X | X | | X | X | |
| 1910.1030 Bloodborne pathogens | X | X | X | | X | | |
| 1910.1043 Cotton dust | | | | | | X | |
| 1910.1044 1,2-dibromo-3-chloropropane | X | X | X | | X | X | |
| 1910.1045 Acrylonitrile | X | X | X | | X | X | |
| 1910.1047 Ethylene oxide | X | X | | | X | X | |
| 1910.1048 Formaldehyde | X | X | | | X | X | |
| 1910.1050 Methylenedi3niline | X | X | | | X | X | |

CHECK THE MASTER LIST at <https://repository.msfc.nasa.gov/directives/directives.htm>
 VERIFY THAT THIS IS THE CORRECT VERSION BEFORE USE

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|--|-------------------------------------|------------------------|---------------|---------------|-------------------------|-------------|-----------------------|
| 29 CFR 1926 Safety and Health Regulations for Construction | Protective Clothing | Gloves or Hand-wear | Foot- wear | Head- wear | Eye or Face- wear | Respirators | Hearing Protectors |
| Construction Standards | | | | | | | |
| 1926.52 Occupational noise exposure | | | | | | | X |
| 1926.55 Gases, vapors, fumes, and mists | X | X | X | X | X | X | |
| 1926.106 Working over or near water | X | | | | | | |
| 1926.201 Signaling | X | | | | | | |
| 1926.300 General requirements (hand and power tools) | X | X | X | X | X | X | X |
| 1926.303 Abrasive wheels and tools | X | X | X | X | X | X | X |
| 1926.353 Ventilation and protection in welding, cutting, and heating | X | X | X | X | X | X | |
| 1926.354 Welding, cutting, and heating in way of preservation coatings | | | | | | X | |
| 1926.400 General requirements (electrical) | X | X | X | X | X | | |
| 1926.403 Battery rooms and battery charging | X | X | X | X | X | X | |
| 1926.551 Helicopters | X | | | X | X | | |
| 1926.605 Marine operations and equipment | X | | | | | | |
| 1926.650 General protection requirements excavations, trenching, and shoring | X | X | X | X | X | X | |
| 1926.800 Tunnels and shafts | | X | | | X | X | |
| 1926.951 Tools and protective equipment | | X | | X | | | |

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APPENDIX B PPE HAZARD ASSESSMENT

PPE Hazard Assessment Performed By: _____

Org. Code: _____ Date: _____

Work Area and/or Operation: _____

Building: _____ Room: _____

Affected Employee(s): _____

This appendix provides a general list of hazards in the work area. Supervisors shall mark the appropriate hazard and indicate the corrective action taken.

Eye & Face Protection (1910.133) [Ref.: ANSI Z87.1]

| Survey Questions | No | Yes | Suggested Corrective Actions | Corrective Actions Taken |
|--|----|-----|--|--------------------------|
| Flying particles? | | | Safety glasses ⁽¹⁾ with side guards | |
| Molten metals? | | | Face shield and goggles | |
| Liquid chemicals? | | | Chemical goggles | |
| Acids/caustic liquids? | | | Face shield and goggles | |
| Chemical gases or vapors? | | | Face shield and goggles (Check respiratory) | |
| Potentially injurious light radiation? | | | Goggles designed to protect for specific light | |

(1) Prescription safety glasses can be procured, but the employee is responsible for the eye examination.

Head Protection (1910.135) [Ref.: ANSI Z89.1]

| Survey Questions | No | Yes | Suggested Corrective Actions | Corrective Actions Taken |
|--|----|-----|---|--------------------------|
| Risk of falling objects? | | | Hardhat required ⁽²⁾ | |
| Possible contact with electrical conductors? | | | Hardhat required (Types A or B) ⁽³⁾ | |

(2) Chin straps required for overhead work.

(3) Type A is rated to 2,200 Volts. Type B rated to 20,000 Volts.

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Hearing Protection (1910.95)

| Survey Questions | No | Yes | Suggested Corrective Actions | Corrective Actions Taken |
|--|----|-----|---|--------------------------|
| Exposed to a time-weighted average of 85 dBA for 8 hours or 115 dBA for any time period? | | | Contact Environmental Health Services, 544-2390 | |

Foot Protection (1910.136) [Ref.: ANSI Z41.1]

| Survey Questions | No | Yes | Suggested Corrective Actions | Corrective Actions Taken |
|--|----|-----|---|--------------------------|
| Danger of foot injury due to falling or rolling objects? | | | Order safety shoes | |
| Danger of objects piercing the sole? | | | Order safety shoes | |
| Danger of exposure to electrical hazards? | | | Electrical hazard footwear is intended to provide protection against open circuits of up to 600 volts under dry conditions ⁽⁴⁾ | |
| Danger of static electricity buildup? Note: A conductive shoe tester should be provided in ESD sensitive areas. | | | Conductive safety shoes are designed to protect against hazard of buildup of static electricity ⁽⁵⁾ | |
| Oil or chemical hazards? | | | Use oil and chemical resistant safety shoes/boots | |

(4) Note: Electrical hazard shoes are NOT intended for use in explosive or hazardous locations where conductive footwear is required.

(5) Note: Conductive shoes are to be used only in areas designated as ESD sensitive areas.

Hand Protection (1910.138)

| Survey Questions | No | Yes | Suggested Corrective Actions | Corrective Actions Taken |
|---|----|-----|--|--------------------------|
| Skin absorption of harmful substances? | | | Use gloves recommended in Material Safety Data Sheets (MSDS) | |
| Severe cuts, punctures, or abrasions? | | | Use protective gloves/gauntlets | |
| Chemical burns? | | | Use gloves recommended in MSDS | |
| Thermal burns/harmful temperature extremes? | | | Use protective gloves/gauntlets - welders gloves | |

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| | | | | |
|--|--|--|---|--|
| Blood or other biological hazards? | | | Contact Environmental Health Services, 544-2390 | |
| Hyperbaric (O ₂ > 25%) atmospheres? | | | Contact Environmental Health Services, 544-2390 | |

Protective Clothing

| Survey Questions | No | Yes | Suggested Corrective Actions | Corrective Actions Taken |
|---------------------------------------|----|-----|--|--------------------------|
| Fire? | | | Use fire-resistant clothing, jump suit, lab jacket, and/or welder's jacket | |
| Abrasion? | | | Use abrasion-resistant clothing | |
| Exposure to particulate contaminants? | | | Clean room disposable coveralls | |
| Static electricity shock hazards? | | | Electrostatic wrist strap | |
| Hazardous chemicals? | | | See MSDS | |
| Cryogenics? | | | Use clothing approved for cryogenic work | |
| Radiological hazards? | | | Contact Environmental Health Services, 544-2390 | |
| Biological hazards? | | | Contact Environmental Health Services, 544-2390 | |
| Hyperbaric atmospheres? | | | Use approved fire resistant clothing | |

Respirators (1910.134) [Ref.: MPD 1840.3]

| Survey Questions | No | Yes | Suggested Corrective Actions | Corrective Actions Taken |
|------------------|----|-----|------------------------------|--------------------------|
| Harmful Dust? | | | See MSDS | |
| Harmful fogs? | | | See MSDS | |
| Harmful fumes? | | | See MSDS | |
| Harmful mists? | | | See MSDS | |
| Harmful gases? | | | See MSDS | |
| Harmful smoke? | | | See MSDS | |